Backstage WITH Blackstone

MATH MAGIC

BLACKSTONE'S A GREAT MAGICIAN, BUT THESE TRICKS OF HIS AREN'T MAGIC. THEY'RE MATH, AND *YOU* CAN DO THEM!

HEADS UP!

• What you need: ten dimes (or ten of any coin).

1. Have a friend throw the ten dimes on a table. Quickly count the number of coins that are heads up. Remember if it's an odd or even number.
2. Now turn your back. Tell your friend to turn over some of the coins, two at a time. Then tell her to cover any one coin.
3. Turn around and quickly count the number of heads showing now. If the number of heads is still what it was (odd or even) then your friend is covering a tail. If the number of heads has changed (from odd to even or even to odd) then your friend is covering a head.
4. Announce what's hidden under your friend's hand. Can you figure out why this works?

DIME TIME

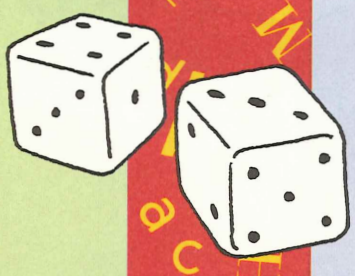
• What you need: a dime and a penny.

1. Give your friend a dime and a penny, turn your back and tell her to hold one coin in each fist.
2. Turn around again and tell your friend to multiply the value of the coin the right hand by a four, six or eight. Then tell her to multiply the value of the coin in the left hand by three, five or seven.
3. Tell your friend to add the two numbers and tell you the total. If the total is an odd number then the dime is in the right hand. If the total is an even number then the dime is in the left hand. Why do you think this works?

PICK A CARD

• What you need: six playing cards, a pair of dice, and a cup.

1. Have your friend shuffle the six cards and put them in a stack, face down.
2. While you turn your back, have your friend roll the dice, then choose one die, look at the number that's showing, and cover it with the cup. The number on that die is his secret number.
3. With your back still turned, tell your friend to turn over the cards one at a time, until he reaches his secret number. For example, if his secret number is three, he would turn over the top three cards. Have your friend memorize the card that's showing and put the cards back the way they were.
4. Now turn around, and tell your friend you can use math magic to find the card he just memorized. Look at the die that's not covered. (Let's say that a two is showing.) Take the stack of cards and put it behind your back. Carefully take two cards from the bottom of the stack and place them on top. (If a four was showing on the die, you'd take four cards from the bottom of the deck, etc.)
5. Put the stack of cards back on the table. Ask your friend to add his secret number to the number on the die that's still showing. For example, if the covered die was showing a three and the uncovered die was showing a two, then the total would be five. Have your friend turn the cards over one at a time until he's counted out the total (in this case the fifth card). That will be the secret card. You can always find your friend's secret card with this trick. It may look like magic, but it's really mathematics!

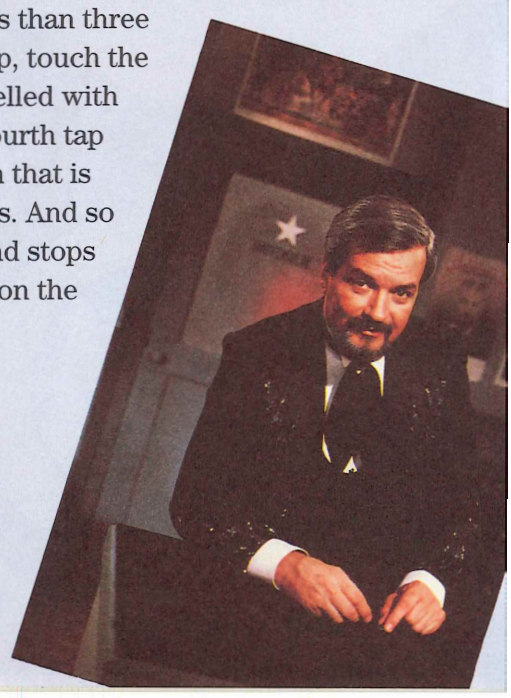


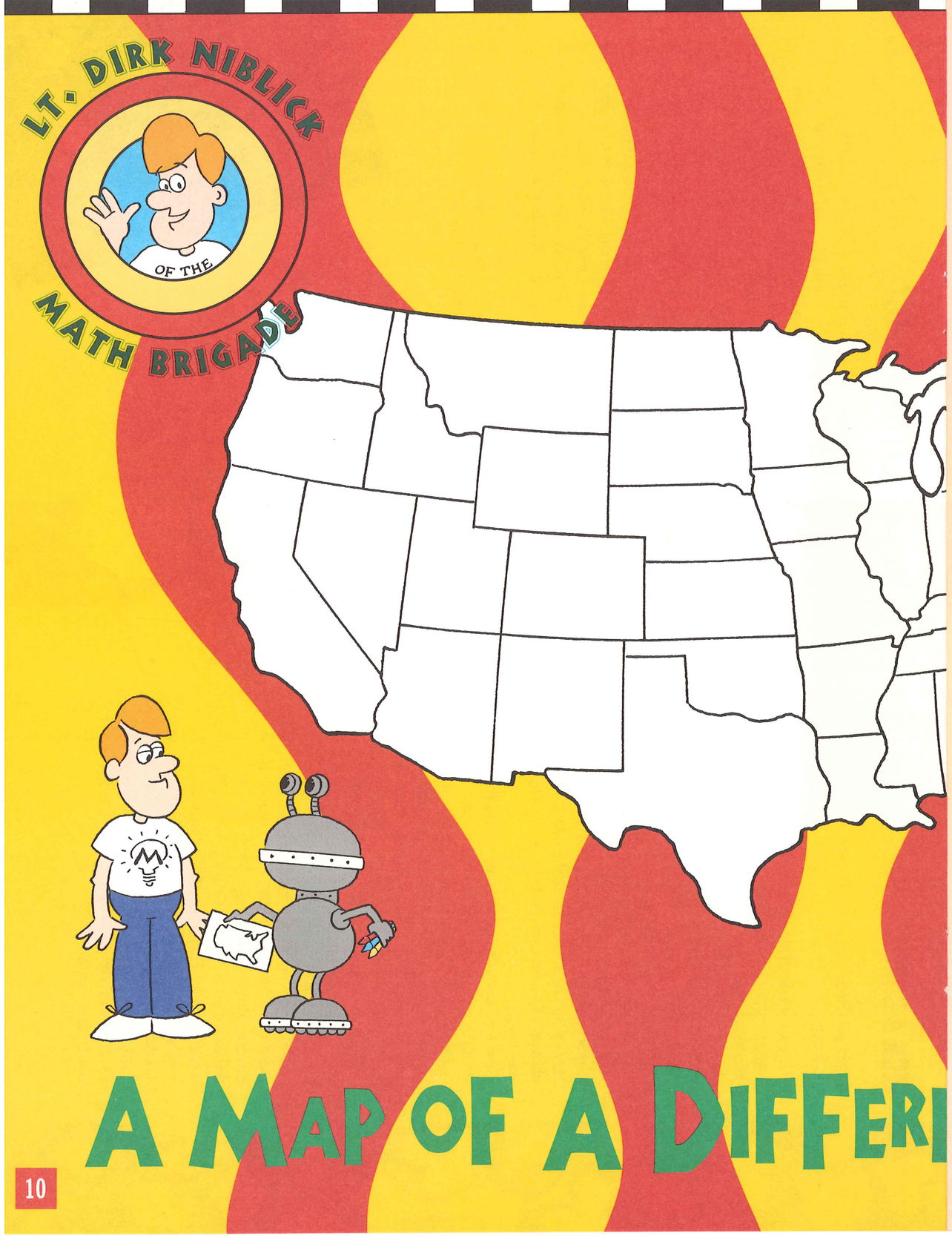
LETTER PERFECT

• What you need: a collection of seven or eight objects. They can be any objects, with one catch—each object has to have a different number of letters in its name. Like these: key, ring, ruler, eraser, quarter, lunchbox, sharpener, dictionary.

1. Here's a neat trick that combines math and spelling! Ask a friend to pick an item, without telling you what it is. Then have your friend close his eyes.
2. Tell him to silently spell the name of the item while you tap him on the shoulder. Each time you tap him, he should silently add another letter.
3. Have him tell you when he's reached the last letter As soon as he's done, you tell him which item he picked.

How do you do it? Each time you tap your friend on the shoulder, tap an item with your other hand. The first two times you can tap any item, because no item is spelled with less than three letters. On the third tap, touch the key, the item that is spelled with three letters. On the fourth tap touch the ring, the item that is spelled with four letters. And so on . . . When your friend stops you, your hand will be on the item he picked! ◇





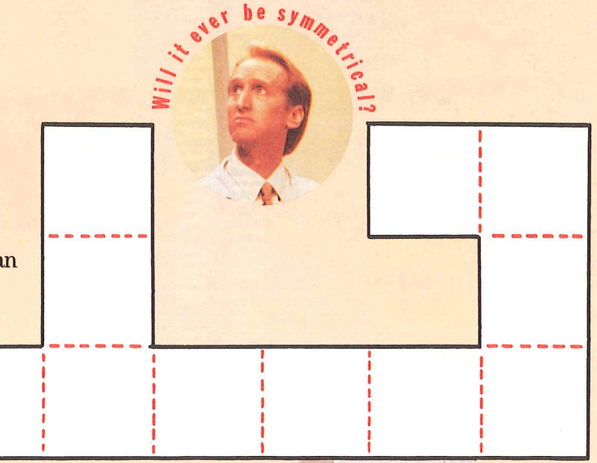
A MAP OF A DIFFERI

Where do you go when you're really out of shape? To...

GENERAL MATHPITAL

Here at General Mathpital, the tireless doctors are wrestling with a case of asymmetriosis (pronounced a-sim-eh-tree-o-sis). Yes, asymmetriosis is a lopsided geometric ailment in which a shape is not symmetrical. A shape is symmetrical if there's a way of folding it so it has two matching halves.

Luckily, there is a cure. By cutting the shape apart (don't worry, it doesn't hurt), our doctors can put it back together so that it's symmetrical.



THE PATIENT

But the doctors can't agree on how to perform the operation. Dr. Kutitout says he can make the shape symmetrical by making four cuts and then putting the pieces back together. Dr. O. Penwyde says she can perform the operation with fewer cuts. Can she do it? (Remember, she can only cut along the dotted lines.)

Both doctors have a solution. Can you find them? Can you find other solutions? What is the smallest number of cuts that have to be made to make a symmetrical shape?

ANSWERS ON THE INSIDE BACK COVER

What's My Number ?

If you want to find out what people do for a living, you ask them about their jobs. When you want to know what to call someone, you ask his or her name. But what do you do when you want to find a secret number? You ask number questions. That's how you play "What's My Number."

Here's how it works. Have a friend pick a number that's on the grid at right. Then you have to find out what the number is by asking yes or no questions.

What kind of questions should you ask? We picked a secret number and challenged a friend to find it. Here are the questions he asked—and our answers. After those six questions, our friend knew the number. Do you?

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Q: Is the number larger than 50? A: Yes

Q: Is it less than 70? A: No

Q: Is it an even number? A: No

Q: Is the number a multiple of 5? A: No

Q: Does the number have seven as one of its digits? A: Yes

Q: Is it a multiple of 3? A: Yes

Now that you've got the hang of it, you can play "What's My Number" anywhere, anytime. And you can play it a number of ways. To play with a friend, take turns: First you pick a secret number and your friend asks questions. For every question, he or she gets one point. Then switch: Your friend picks a number and you ask the questions. Challenge each other with four numbers. Whoever has the lowest score (by using the fewest questions) wins the game.

You can also challenge a number of friends. Let them decide on the questions together. And when you've found the answer, don't forget to say: I've got your number! Strategy: You can improve your score by asking fewer questions, but how can you make each question do the most work? How many numbers should you eliminate with each question? See what strategies your friends use.

ANSWER ON INSIDE BACK COVER

Dirk Niblick of the Math Brigade here. I've got an instructive story for you about maps, crayons and an improbably silly creature from outer space.

Just the other day, when I was considering the question of how many houses on my block have prime numbers in their addresses, my musings were disturbed by a strange knock on the door. Actually, the knock itself wasn't strange, but the knocker was. Standing there was a small, inhuman creature with greyish skin and eyeballs that floated on long stalks. Strangest of all, the creature was holding three crayons and a map!

"Hello," said the creature. "I need some help."

"You certainly do," I said. "I think you're on the wrong planet."

The creature quickly explained that he had been sent from the planet Twitch to explore Earth and bring back some maps. He had managed to obtain a map of the United States (not including Alaska and Hawaii) but it was in black and white.

"The map must be colored," the creature sadly explained. "No two areas that share a boundary line can be the same color. And I have only three crayons. Do you think that will be enough?"

"An interesting problem," I replied. "I know it has been mathematically proven that any flat map can be colored with four colors. There are also maps that can be colored with fewer colors—some maps require as few as two colors."

"Great," said the creature. "But how can I tell if I need four colors for this one? And where can I get another color crayon if I need it?"

"I have another crayon," I said. "As for coloring your map, perhaps you should just try."

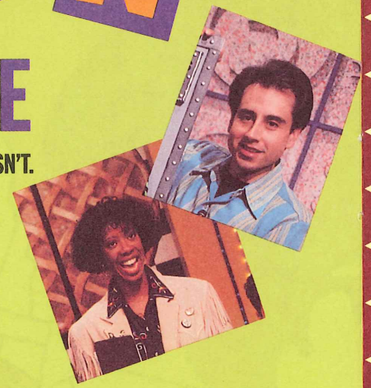
And so the creature from Twitch and I proceeded to color the map. Do you think we did it with three colors, or did we have to use four? Why don't you give it a try? Use the map at left. And when you're done coloring that map, try drawing one of your own. Can you create a map that can be colored with just three colors if no two areas that share a stretch of boundary are the same color? Try drawing a map that has at least ten different regions on it. Can you draw a map that can't be colored with just four colors?

It's also possible to create a map that can be colored with only two colors. Don't believe me? See the answer page at the back of the book.

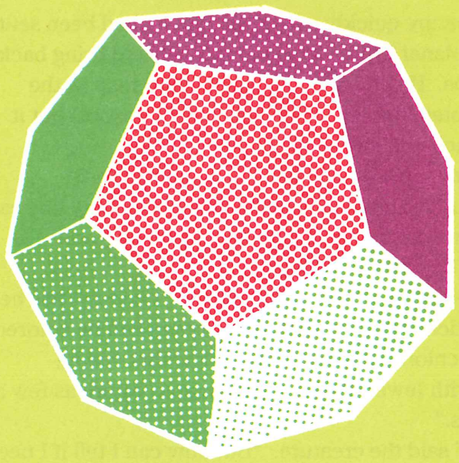
Color away and **USE YOUR NOODLE!**

ANSWER ON THE INSIDE BACK COVER

SQUARE ONE CHALLENGE



CAN YOU MEET THE SQUARE ONE CHALLENGE? YOU DECIDE WHO'S TELLING THE TRUTH AND WHO ISN'T. IT COULD BE EITHER ONE OF THE PANELISTS, OR BOTH—OR NEITHER. ARE YOU READY TO SEPARATE MATH FACT FROM MATH FICTION? THEN TAKE THE CHALLENGE!



QUESTION 1

If you have six different T-shirts, how many pairs of shorts will you need to make at least 20 different combinations?

Beverly: That's easy. Since you already have six T-shirts, you need 14 pairs of shorts to make 20 combinations.

Chris: I disagree. I think you need only four pairs of shorts to get more than 20 combinations.

Who's telling the truth, Chris or Beverly? Is the answer four or is it 14? Or are they both wrong? Or . . . are they both right?

QUESTION 2

The shape above is a dodecahedron. That's a three-dimensional shape with 12 faces. All the faces are the same size. Three of the faces are green, four are purple, and five are red. If you rolled this dodecahedron 600 times, about how many times would each color come up?

Chris: All three colors would come up about the same number of times, 200 times.

Beverly: I think the red would come out on top about 250 times, the purple about 200 times, and the green about 150 times.

What do you think? About how many times is each color likely to come up?

QUESTION 3

The twins Gus and Gertie have a bunch of grapes. One of them has three times as many grapes as the other. Gus has 27 grapes. How many grapes do you think Gertie has?

Chris: I think Gertie could have nine grapes.

Beverly: She could have 81 grapes.

Who's right, Chris or Beverly? Or are they both right? Both wrong?

ANSWERS ON THE INSIDE BACK COVER

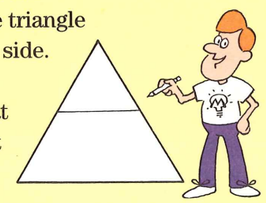
CONTINUED

LT. DIRK NIBLICK OF THE MATH BRIGADE

WELCOME BACK, COWPOKES. When I left, you was figuring out how to divide the triangular Verbosarosa Ranch into four parts that are all the same size. You done figured it all out by now?

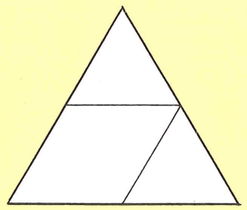
Well, them Cartwrongs figured too. They come up with a mess of ways to do it—all wrong. But the one way Dirk showed 'em was real simple. And it was right!

First he drew a line from the midpoint of one side of the triangle to the midpoint of another side.



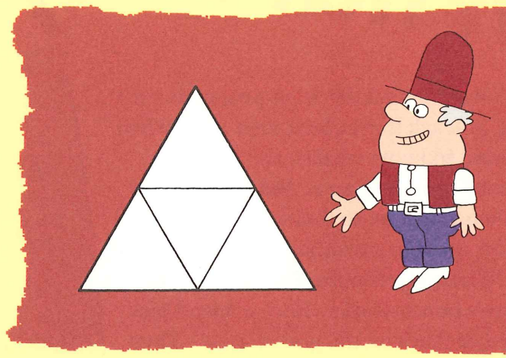
"What good's that do?" grumbled Little Moe. "That splits the ranch in two, not four, and the pieces ain't the same size."

"If you'll kindly hold your horses," Dirk said, "I'll continue." He drew a line connecting the midpoint of the first side to the midpoint of the third side of the triangle.



"It's still not in four parts," Dirk said. "But perhaps you can see where to draw the next line."

"I know!" shouted Cow. "Connect the two midpoints that ain't connected yet, like this!"



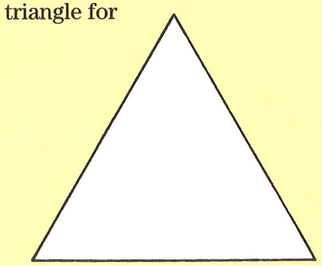
"Well, I'll be a hornswallowed hoptoad!" shouted the other Cartwrongs. "You did it!"

"It was nothing," Dirk said modestly. "In fact, this solution will work on any triangle, not just an equilateral triangle like the Verbosarosa. Now perhaps you can answer a question for me."

"Sure," said Cow. "Just you name it."

"What on earth is a hornswallowed hoptoad?"

So, buckaroos, that's how Dirk divided the most triangular ranch south of Saskatchewan. But it ain't the end of our story. Cause right after Dirk left, Little Moe plumb up and quit the cowboy business and gave his share of the ranch to his three brothers. Now they had to divide the Verbosarosa into *three* parts that were the same size. Can you find a way? Here's another triangle for you to practice on:



Give it a try while I ride off into the sunset.

USE YOUR NOODLE!

HOME ON THE PLANE — PART II

"Now Mr. Monger, tell the court—was I on that flight?"

Monger stared at George. After a few seconds he cleared his throat. "Of course you were," he said. "Don't you remember? You told me you were driving to Los Angeles that morning."

There were gasps and exclamations through the court. George looked stunned. "What can I do, Kate?" he asked. "I can't prove I'm innocent. Even *I'm* beginning to think I robbed the bank."

"Someone is trying to make it look like you did," I told him. "We've got to prove you weren't on that plane. And I know how."

STOP! BEFORE YOU READ THE REST OF THE STORY, CAN YOU FIGURE OUT HOW KATE MIGHT PROVE THAT MONGER IS LYING? HINT: IT'S AS EASY AS FALLING OFF A LOG— IF YOU KNOW WHICH KIND OF LOG WE MEAN!

George asked for a recess while I ran out to make a phone call. A few minutes later, I was back, but George was gone! He ran back in just as the judge was calling the room to order.

"Well, Mr. Frankly," the judge sneered. "Do you want to confess or will you call more witnesses?"

"Your Honor," I said, standing up, "I have some evidence that will prove George Frankly is innocent!" I walked over to a map of the lake where George had spent his vacation.

"Your Honor," I said. "Mr. Monger says he flew to Nomanisan Island and arrived at 7:45 on the morning of the bank robbery. But he couldn't have done that. On the morning of Friday the 13th, there was a heavy fog over the lake from 7 A.M. until 9:30. No plane could have flown through it. Mr. Monger is lying!"

The people in the court all started talking at once.

"Ms. Monday," the judge said sternly. "Can you prove this?"

"Yes, your Honor." I took out George's weather log. "Here's a log of the weather conditions George kept while he was on the island. And I just called the national weather bureau. They will confirm George's records. The plane couldn't have flown."

"Well," the judge said in a very surprised tone. "I guess this proves you're innocent, Mr. Frankly."

George stood up and faced the judge. "Yes, your Honor," he said. "Except for one thing. I'm guilty."

"What?" said the judge.

"George, are you nuts?" I shouted.

"It's no use, Kate," George said. "Say goodbye to my wife and kids."

"Kids?" I repeated. "George doesn't have any kids! Judge, this man is not George Frankly!"

"What?" the judge said, looking even more confused. "If he's not Frankly, who is?"

"I am!" came a shout from the back of the courtroom. In ran George, or another man who looked exactly like George, except instead of wearing his blue Mathnet blazer, he was wearing an undershirt and a pair of shorts with little red hearts on them.

"That Frankly is an imposter!" the man in the shorts yelled. He ran up to the first George and pulled on his nose. The first George's nose came off—it was part of a mask!

"That's not me, *I'm* me!" said George. "This imposter is Jake Karamazov, one of the Karamazov brothers—a pair of crooks I sent to prison years ago. They wanted to get back at me so they made it look like I robbed the bank. Jake tied me up and took my clothes so he could be me and plead guilty."

"And Monger?" I asked, looking around for the pilot.

"Grab him!" George shouted to the court guard as Monger tried to slip out the door. "He's the other Karamazov!"

The judge ordered the Karamazov brothers to jail. (And he ordered George to put his pants on.) George was free!

"That was quick thinking," George said to me as we left the courtroom. "To look at my weather log."

"Always check the facts," I said.

"I was too worried even to think of it," George said.

"Yes," I answered. "I guess you could say you were in a fog."

The Karamazov brothers were found guilty of a 967.8, pretending to fly in a fog without a license, a 594, robbing a bank on Friday the 13th, and a 32.89, impersonating a mathematician. They were sent to jail for a long, long time.

THE CASE OF THE MISSING BASEBALL

MATHNET

THE STORY YOU ARE ABOUT TO READ IS A FIB, BUT IT'S SHORT. THE NAMES ARE MADE UP BUT THE PROBLEMS ARE REAL.

Monday, 2:30 P.M.

It was summer in L.A. and hot, really hot. It was warm, too. My partner is George Frankly. I'm Kate Monday. I'm a mathematician.

George and I were working out of Mathnet headquarters when we got a call about a missing baseball.

"George, some kids have lost their baseball," I said. "Let's roll."

We arrived at the scene and proceeded to gather the facts.

"I belted the ball into left field," said Nell, one of the team sluggers. "We searched everywhere and can't find it."

"That ball was autographed by Babe Ruth," added Howie, a tall kid with a worried look on his face. "It belonged to my dad. If we don't find it, he'll skin me alive. You've got to find it."

"Did you look in left field?" George asked the kids.

"Sure," said Howie. "It's not there."

George and I took a look in left field.

"Did you notice something, George?" I asked. "There's a billboard in left field. Maybe the ball bounced off the sign."

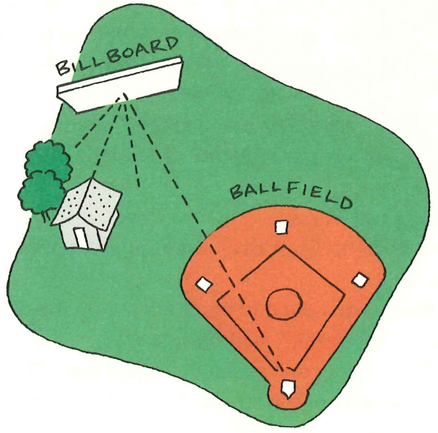
We took a close look at the sign.

"Look at this mark," George said, pointing to a brown spot about the size of a baseball. "I bet the ball hit the sign here."

Quickly I sketched a map of the ball field.

"From this we can tell which way the ball would go," I said, "because the angle of incidence equals the angle of reflection."

"That's right," George agreed. "The ball would bounce off the sign at the same angle it hit the sign." He paused for a minute. "But which way did the ball go?"



STOP! WHERE MIGHT THE BALL HAVE GONE? MAKE A GUESS BEFORE READING FURTHER.

"If we're correct about the angle at which the ball hit the sign," I said, "then it must have gone toward that house."

We investigated the house. It belonged to a Mrs. MacGregor. She told us she was out shopping around the time the kids were playing and hadn't seen any sign of the baseball.

George and I went back to headquarters to go over the facts.

"George," I said, "maybe Mrs. MacGregor had the door open when Nell hit the ball. What if the ball bounced inside the house?"

"Talk about a home run!" George said.

I called Mrs MacGregor and asked her if we could look inside her house.

"Sure," she said. "There's just one problem. My house has been stolen!"

Tuesday, 9:15 A.M.

George and I went back to Mrs. MacGregor. Her house was missing, all right. If we wanted to find that baseball, we'd have to find the house.

We didn't see any tire tracks, so we knew the house hadn't been taken away on a truck. It would take too long to dismantle it and we felt pretty sure a neighbor would have heard something if the house had been blown up. We eliminated the possibilities one by one. At last there was only one left—the house had been lifted by helicopter.

We talked to an expert on helicopters and found there was only one type that could lift a whole house: the XY 313. There were only three XY 313's in the area. George called the owners of all three and found that one had been rented out the night Mrs. MacGregor's house had been stolen.

"It was rented by a man named Clarence Sampson," George told me. "He lives at 727 Bluff Drive."

"Let's roll," I said.

We drove to Bluff Drive and found numbers 726 and 728.

"That means the odd numbers are on the other side of the street," said George.

"There's only one problem," I told him. "There is no other side of the street. Bluff Drive is on a cliff. The address is a phony!"

Wednesday, 3:45 P.M.

Back at headquarters, George and I tried to gather more facts. If we couldn't find Clarence Sampson, we could still try to track down the house.

"If a helicopter that big picked up the house, why didn't someone see or hear it?" I asked George.

"Maybe it was a very quiet helicopter," George suggested.

"No such thing," I said. "Someone must have heard something."

I called Howie and had his friends talk to everyone in the neighborhood to find out if anyone had seen or heard anything suspicious the night the house was stolen. Soon people started calling in.

"Howie says Mrs. MacGregor's neighbor to the southeast had trouble with his television reception around 10 P.M. that night," George said, hanging up the phone.

"And Nell called," I told him. "She said someone five blocks east and ten blocks south of Mrs. MacGregor's also had bad TV reception."

"Sounds like interference," George said. "Could have been caused by a helicopter."

Just then the phone rang again.

"It's Howie," I told George. "He says someone on the 300 block of South Elm Street also had bad TV reception at about 10:15 that night. Now Howie wants to know which way he should go to look for more TV interference."

George took out a map of the area.

"If we plot the houses we know had interference on the map," he said, "we should be able to figure out which way the helicopter flew."

STOP!

CAN YOU FIGURE OUT WHICH WAY THE HELICOPTER WENT WITH MRS. MACGREGOR'S HOUSE? BEFORE YOU READ ANY MORE, LOOK AT THE MAP ON P. 15. USE A PENCIL TO PLOT THE PLACES WHERE THERE WAS BAD TELEVISION RECEPTION. THEN DECIDE WHERE KATE AND GEORGE SHOULD LOOK FOR THE HOUSE.

THE TRIAL OF GEORGE FRANKLY

THE STORY YOU ARE ABOUT TO READ IS A FIB, BUT IT'S SHORT. THE NAMES ARE MADE UP BUT THE PROBLEMS ARE REAL.

MATHNET

Friday, 2:18 P.M.

It was a bright spring day in L.A. Somewhere birds were singing. Somewhere people were laughing. But there was no joy at Mathnet.

I'm Kate Monday. I'm a mathematician. My partner is George Frankly. Things looked bad on that spring afternoon. George was on trial for bank robbery and all the evidence said he did it. Even George was beginning to have doubts.

"On the day of the robbery, I was on a fishing trip on Nomanisan Island, in the middle of a lake in the Great North Woods," George said, looking worried. "But I can't prove it."

George had good reason to be worried. There was a videotape of someone who looked exactly like him robbing the bank of $250,000. There was a record that George, or someone posing as George, had deposited $250,000 in George's bank account later that same day. Since George had been fishing alone, he had no witnesses to prove he was there. And to top it off, George had picked someone with no experience to be his lawyer—himself!

"Think, George," I told him, while we waited for the judge. "Didn't anyone see you there? What did you do all day?"

"I fished, Kate," he answered. "That's what I do on fishing trips. Oh, I also kept track of the weather. That's my hobby—weather."

George showed me his notebook from the trip.

"That's nice, George," I told him. "But it doesn't prove you were on the island."

"The only way off the island is by boat or plane," said George. "And the boat didn't leave until Saturday, so I couldn't have taken it to rob a bank on Friday. That leaves the plane." He sighed. "The prosecution is trying to prove that I took the plane to the airstrip at Motz Landing that morning, drove to Los Angeles, robbed the bank at noon, drove back to Motz Landing and took the plane back to the island at 4 P.M. But it's 150 miles from Motz Landing to the bank. I don't see how I could have done it, even if I had wanted to."

"How long is the plane ride from the island to Motz Landing?" I asked, getting out a pad and a pencil.

"About 30 minutes," George answered.

"And when does it leave the island?" I asked.

"Between 7:30 and 8 A.M.," George said glumly. "I still don't see how I could have done it."

STOP! **COULD GEORGE HAVE GOTTEN TO LOS ANGELES IN TIME TO ROB THE BANK?**

I did some figuring on my pad. "Sorry, George," I said. "If you travelled at the speed limit of 55 miles per hour, it would have taken about three hours to drive to Los Angeles. You could have robbed the bank."

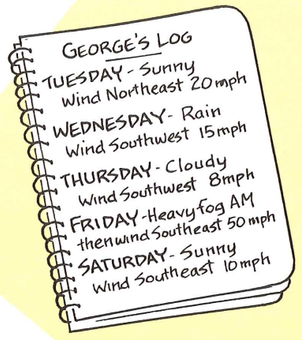
"But I didn't!" George said helplessly.

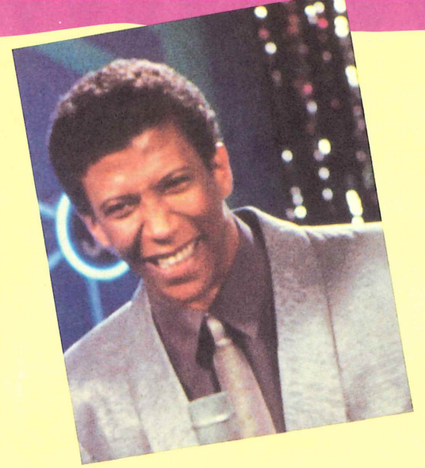
The court clerk called the next witness, Mr. Monger, the pilot and owner of Fishmonger Airlines. A tall, red-haired man wearing a leather coat and an old-fashioned pilot's cap took the stand.

"Mr. Monger," George began, pacing in front of the witness stand. "We know that the only way off Nomanisan Island Friday morning was on your plane. Mr. Monger, when did your plane leave Nomanisan Island on Friday, July 13?"

"The regular time," Monger said, looking around the room. "I left Motz Landing at 7:15 and arrived at the island at 7:45. Then I flew back to Motz Landing and got there at 8:15."

"I see," George said. He turned to Mr. Monger and in a dramatic voice said,

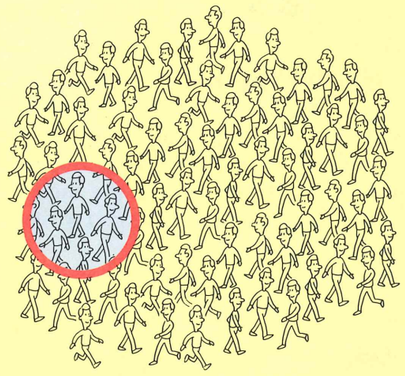


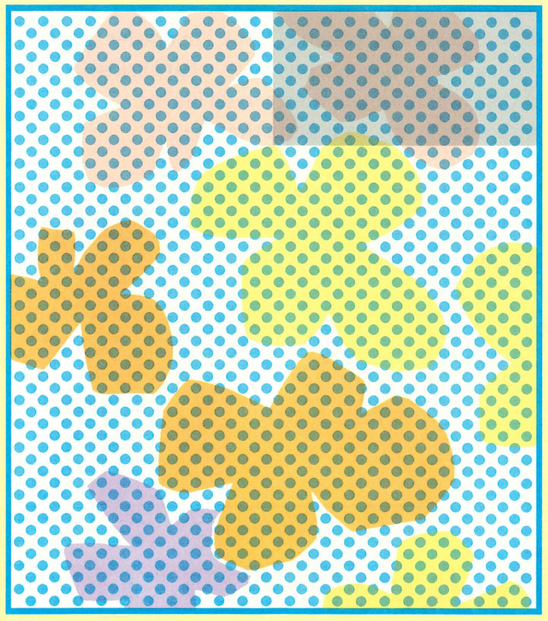


CAN YOU ESTIMATE? IT'S A CLOSE CALL

Welcome to "Close Call," the game show where your guess is as good as mine and counting doesn't count! I'm Glen Closeenuff, your host. The object of our game is to estimate. Estimating isn't making any old guess, you know. You have to base your estimate on information.

Here's our first challenge: About how many dots are in the drawing below? Can you get close to the actual number without counting the dots? What if I tell you that there are 121 dots in the shaded box?





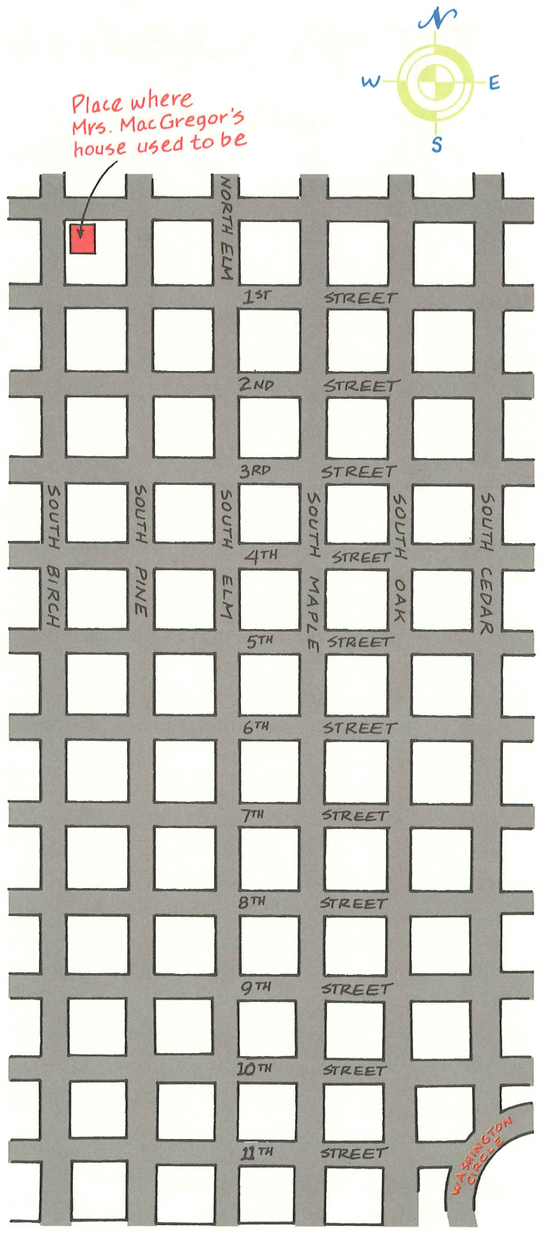
Now here's our second challenge. Look at that crowd of Wallys above. How many do you think there are? What if I told you the shaded circle holds 4 Wallys? Can you estimate about how many of the little guys there are in the whole picture?
Check out your estimates on the inside back cover. How close did you come?

Don't forget—you can play "Close Call" at home with a friend. If you weighed all the kids in your class together, how much would they weigh? How many hot dogs get sold in the school cafeteria every day? How many gallons of water does it take to fill the class aquarium? Make an estimate and then check it out. Once you get the hang of it, make up your own problems and challenge your pals. Remember, you don't have to get the answer exactly right—just make it a CLOSE CALL!

ANSWERS ON THE INSIDE BACK COVER

Thursday, 10:25 A.M.

Howie looked to the southeast and found three more people who reported bad TV reception the night the house was stolen. The reports ended in a neighborhood called Washington Circle.



"The helicopter must have flown to the southeast," I told George. "Let's roll!"

We picked up Howie and drove to Washington Circle. There was a house that looked just like Mrs. MacGregor's, except the shutters were a different color.

"There it is," said George. We got out of the car and knocked on the door. A tall man with brown hair answered.

"Clarence Sampson," I said, "we have reason to believe that you've stolen this boy's baseball."

"Baseball?" Sampson looked surprised. "I didn't steal any baseball."

Just then Howie pushed past Sampson and ran into the house. "There it is!" he shouted, picking an old baseball up from the floor in the corner. "The baseball autographed by Babe Ruth! Why'd you steal my baseball, mister?"

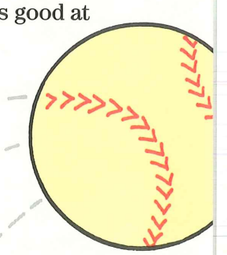
"I didn't steal your baseball," Sampson answered angrily. "I just stole the house!" Then, he added quickly, " I mean, that is, I didn't . . . Oh, well, you got me. I confess."

Sampson told us he'd stolen the house because he knew that another crook had hidden some gold bars there years earlier. He'd been taking the house apart, looking for the gold when we'd caught him. We handed Sampson over to the police and Howie rushed to get the baseball back to his dad.

"You know, that Sampson must have been a good baseball player," George said as we rode back to headquarters.

"How do you figure that, George?" I asked him.

"Don't you see?" George said. "He was good at stealing home."



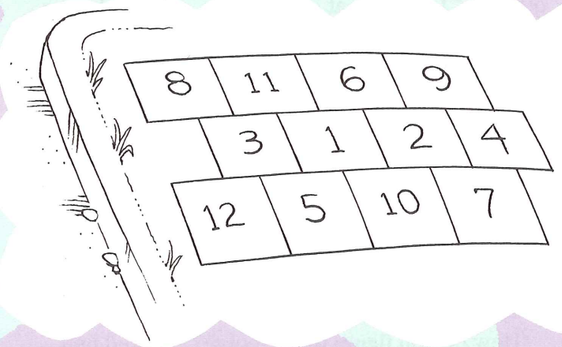
Clarence Sampson was found guilty of a 347.89, stealing a baseball without knowing it, and a 672, taking someone's house with a helicopter. He was sentenced to a number of years behind bars and upon his release gave up crime and became a full-time little league coach.

MATH ON THE RUN

A Math In Motion Game

Math can be a moving experience—especially if you play this game.

First, go outside (check to make sure it's not raining). Then draw this pattern on the ground with a piece of chalk:



Now draw a starting line a few feet from the pattern. Choose a leader (your teacher will do if you're playing at school) and divide into two teams. Your goal is to capture numbers on the board that can be used to produce the leader's number using any mathematical operations. Capture a number by sending one member of your team to stand on it. For example, if the leader calls out "seven" you could send teammates to stand on 3 and 4 (3+4 = 7) or you could send teammates to stand on 7 and 1 (7x1 = 7) or you could send teammates to stand on 12, 4, 1, and 2 (12-4+1-2 = 7). There are many other possibilities.

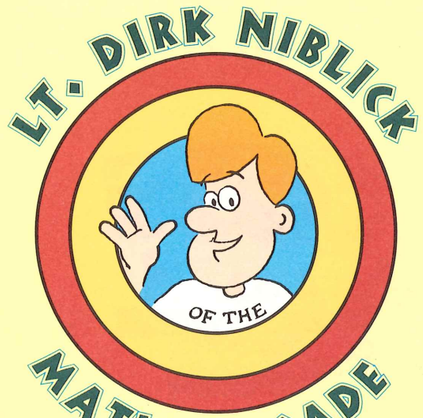
Teams may only send out one player per turn, and no player may stand in a square if someone else is already standing there. Remember, the more players you use, the more points you get.

TO PLAY:

1. Teams line up behind the starting line.
2. The leader calls out a number. Each team huddles and figures out which numbers they want to capture. As soon as you decide, send out one team member to stand on a number.
3. Every time the leader says "go," each team sends out another player to stand on a number. When a team has captured all the numbers it needs, the team members on the board must yell out "Square One!" Then the team has to explain how to produce the number. If they're right, they win one point.
4. If players from different teams go to the same number, those players and that number are out of play for the round.
5. A team may have to change its plans in the middle of the game if the other team captures one of their numbers. For example, if your plan was to capture 3 and 4 to make 7 and the other team captures the 3 square first, you might decide to capture the 2 and the 1 instead.
6. Once someone from your team is on a number, she has to stay there.
7. Don't forget! The more players you use in your solution, the more points you get.

HERE'S HOW TO SCORE THE GAME:

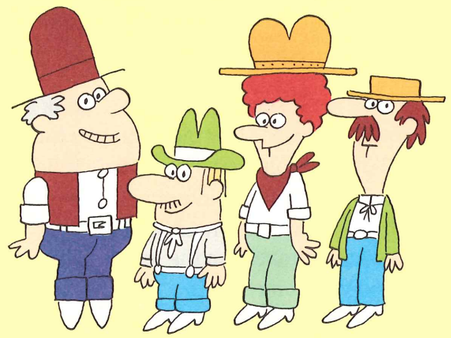
- 1 point for each player used in the solution (but if the solution is incorrect, the team gets no points.)
- 1 point for a correct solution.



FAT GARRETT

HOWDY, BUCKAROOS! I'm Sheriff Fat Garrett and this here's the tale of the Verbosarosa, the goldarndest spread of ranch land west of the Pecos and south of the Rio Grande. Or is that north of the Nachos and east of the Tacos? Or maybe it was north of the Salsa and west of the New Jersey Turnpike?

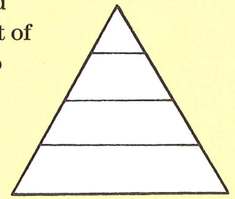
Well, anyway, this spread, the Verbosarosa, was home to the Cartwrong family.



THE CARTWRONGS

When old Pa Cartwrong kicked the bucket, he left the ranch to his four sons to divide among themselves. Only problem was, the ranch was triangular! That's right—it was in the shape of a triangle. How could they divide a triangle into four pieces that are the same size?

Let me tell you, them four Cartwrong brothers figured and scratched and figured some more till their brains was more tangled than a rattlesnake in a salad spinner. Finally, the biggest of the brothers, Cow, come up with this solution:



"But, Cow," complained Little Moe, the orneriest of the four boys. "That don't look fair to me."

Well, them boys commenced to argue. None of them could figure out how to divide the ranch into four pieces the same size. How would you a'done it? Think it over. Got it whupped?

Them Cartwrongs couldn't figure it out, so they decided to call in a genuine mathematical expert—Lt. Dirk Niblick of the Math Brigade.

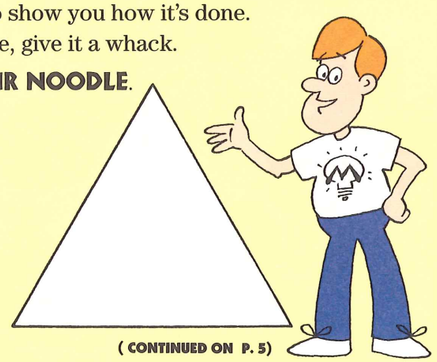
"We can't solve this here conundrum," whined Little Moe.

"What's that?" said Dirk. "A discouraging word? Don't give up. There is indeed a way to divide a triangle into four parts the same size. In fact, one solution is to divide this triangle into four smaller triangles."

Now pardners, you may think I'm crazier than a wildcat on loco weed, but that's what Dirk said.

Can you figure out a way to divide the Verbosarosa into four parts that are the same size? I'll be back later on in this booklet to show you how it's done. Meanwhile, give it a whack.

USE YOUR NOODLE.



(CONTINUED ON P. 5)

HOME ON THE PLANE — PART I

Hi there!
You've seen Square One TV, right? You haven't? Well, you've heard of Square One TV, right? No? Well, you're reading this right now, right? Right!?

Okay, then. So you're reading this and you want to know, what is this, anyway? Which is why we're going to tell you–this is fun! Well, no, actually it's a booklet, but the games in it are fun. How do we know? Because we watch Square One TV and we've seen some of these games, and they *are* fun.

There are puzzles to complete, Mathnet Mysteries to solve and some games you'll want to play with a friend. There are even games for your whole class to play.

Some of the puzzles have answers (they're on the inside back cover). Some have more than one answer (they're not on the inside back cover). For some, it's up to you to make up the answer (you can write it on the inside back cover if you want, but you'll have to get your own pencil). And some of the stories ask you to stop in the middle and figure out the solution before our heroes do. (Maybe it's because they want to peek at your answers.)

And that's it. How can you find out more about Square One TV? The great, funny, exciting math show on Public TV? The one with lots of games, music videos, and cartoons? The one that's on practically every day and all you have to do is look it up in your local listings to see when? Does anybody remember what the question was? Oh, yeah, Square One TV—I guess if you want to find out more, you'll just have to turn the page. Have fun!

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DESIGNED BY COREY EDMONDS MILLEN

SQUARE ONE FUN

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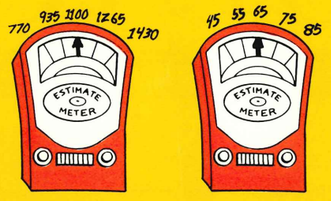
And on the back cover:
MATH COURT
Has a math crime been committed? Let us know and win a Square One TV sticker!

ANSWER PAGE

CLOSE CALL

To find out how good your estimates were, look at our estimate-o-meters.
Where do your estimates fall?



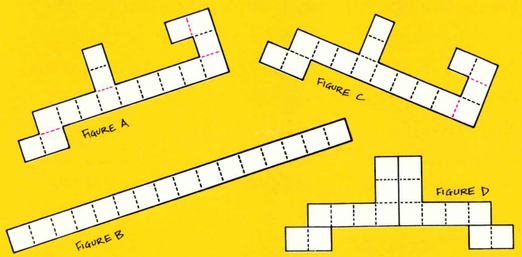
PROBLEM 1 PROBLEM 2

WHAT'S MY NUMBER?

The secret number is 87.

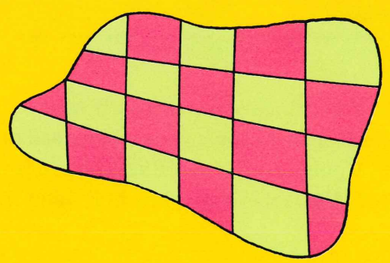
GENERAL MATHPITAL

Dr. Kutitout cut along the dotted lines in figure A and rearranged the shape the way you see it in figure B. Dr. O. Penwyde cut along the dotted lines in figure C and rearranged the shape the way you see it in figure D.



MAP OF A DIFFERENT COLOR

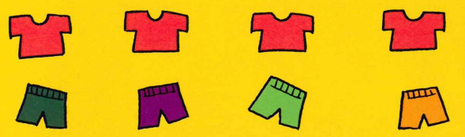
You *can* create a map which can be colored in with two colors and no two shapes that share a boundary line will be the same color. One way to do it is use straight lines. Here's an example:



SQUARE ONE CHALLENGE: THE FACTS—NOT FICTION

QUESTION 1

The correct answer is four shorts. Chris explains: You can match each shirt with each pair of shorts, so you can find the number of combinations by multiplying the number of shirts by the number of shorts. 6 x 4 = 24, which is more than the 20 we need. Do you see that each collection represents 4 combinations?



QUESTION 2

Beverly is right. Since five of the 12 faces are red, then red will come out on top about five out of every 12 rolls. Five twelfths of 600 is 250. Purple will come up about 4 out of every 12 rolls—4/12 (or 1/3) of 600 is 200. And since there are three green faces, a green face will come up about 3/12 of the time, or about 150 times.

QUESTION 3

Both Chris and Beverly are right! All we know from the information given is that one of the twins has three times as many grapes as the other. We don't know which one has more. If Gus is the one with more, then Gertie would have nine grapes. If Gertie is the one with more then she would have 81 grapes.

Who's guilty?
Who's innocent?
Who can count to ten?

WELCOME TO

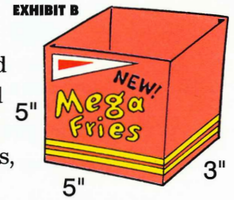
MATH COURT

Where you can read the numbers on the scales of justice.

LADIES AND GENTLEMEN OF THE JURY, this is the case of the state of confusion against Mr. Fried Food, I mean Fred Frood. As you will see, Mr. Frood is guilty of a serious mathematical mistake—he charged less for a large box of french fries than he did for a small box of french fries.

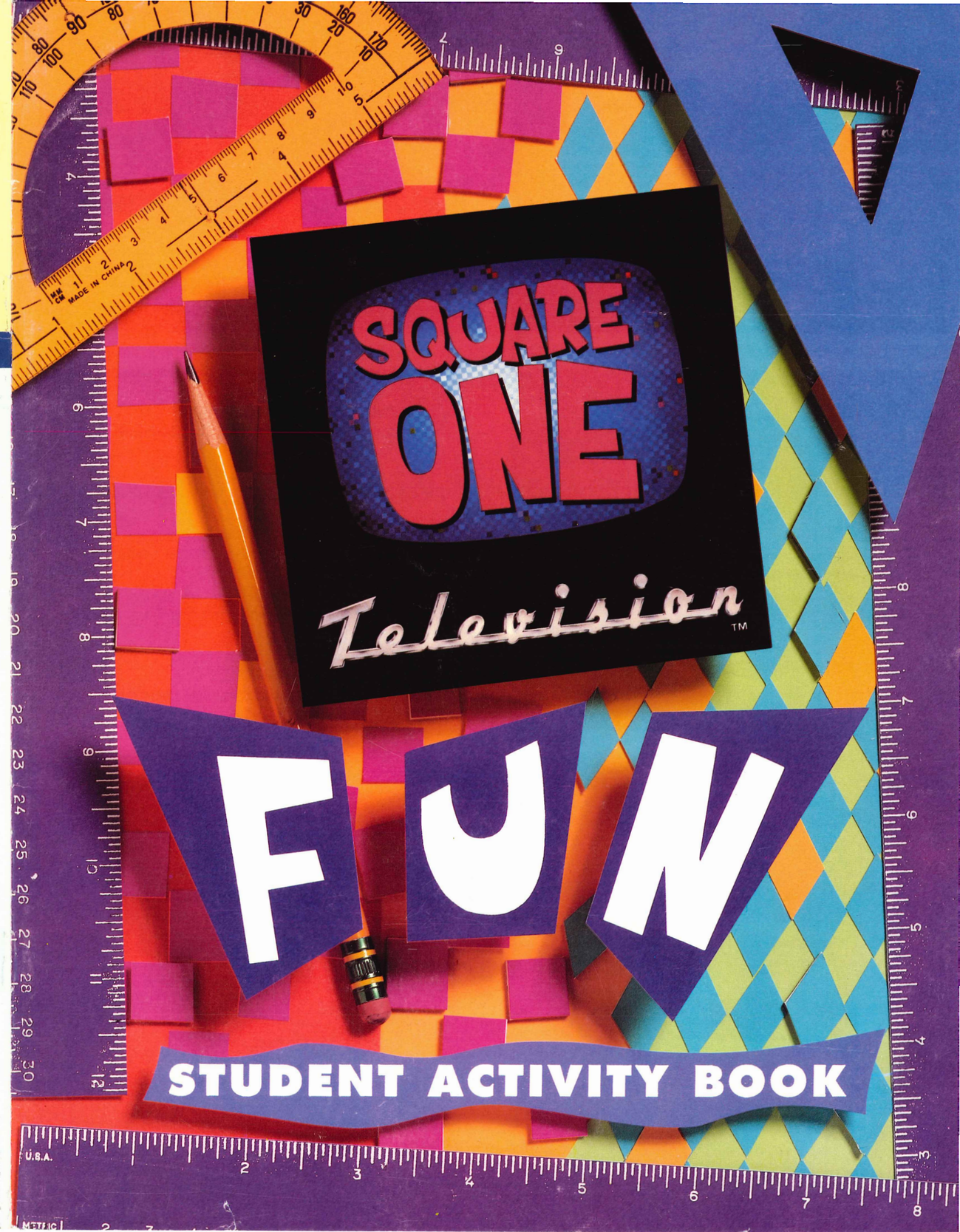
I enter as evidence People's Exhibit A, a box of Mega Fries.

By his own admission, Mr. Food—I mean, Mr. Frood—charged 75 cents for the Mega Fries Box labelled Exhibit A. But he charged one dollar for the obviously smaller Mega Fries box labelled Exhibit B. Of course Mr. Frood claims that the box he charged more for holds more Mega Fries, but just by looking at the two boxes we can see how ridiculous that claim is.



Ladies and gentlemen of the jury, in the face of the humongous amount of evidence against Mr. Frood, you have no other choice but to bring back a verdict of GUILTY!

It's up to you, jury members. Is Mr. Frood guilty of a mathematical error? Which holds more Mega Fries, the box he charged a dollar for or the box he charged 75 cents for? The scales of justice are in your hands. You decide—is he GUILTY OR INNOCENT?

Write your verdict on a postcard and send it to:
CTW
School Services
Box 1SFS
One Lincoln Plaza
New York, NY 10023
Include your name, address and age and we'll send you a rectangular Square One sticker. (Or is that a square Rectangle One sticker?) Offer good while supplies last.

What if the dimensions on box B were changed so it was 10 inches tall instead of five? Would you pay twice as much for that box of Mega Fries as the box in Exhibit B?